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10/593,946	10/09/2007	Andreas Birle	3622	5451
21834 7590 04/01/2009 BECK AND TYSSER P.L.L.C. 2900 THOMAS AVENUE SOUTH SUITE 100 MINNEAPOLIS, MN 55416				
EXAMINER				
BERNSTEIN, DANIEL A				
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3743				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/593,946

Applicant(s)

BIRLE ET AL.

Examiner

DANIEL A. BERNSTEIN

Art Unit

3743

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 October 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 11-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 11-20 is/are rejected.
- 7) ☐ Claim(s) 11, 19 and 20 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 September 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB08)
- Paper No(s)/Mail Date 04/30/2007.
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the drawings in Fig. 1 and Fig. 2 must show how the water cooled ring is rotatable about the axis of the gas injector or the feature(s) canceled from the claim(s). No new matter should be entered. Based on the definition of "rotatable" the drawings should show means for rotating the water cooled ring.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The disclosure is objected to because of the following informalities: The applicant fails to appropriately describe what is meant by the notional prolongation of the generatrix. As these terms are not obvious to one of ordinary skill in the art, the examiner recommends that these terms should be clearly defined.

Appropriate correction is required.

3. Claim 11 objected to because of the following informalities: The applicant claims the notional prolongation of the generatrix and it is unclear and very difficult to discern what the applicant is intending to claim. Appropriate correction is required.

4. Claim 12 objected to because of the following informalities: The applicant claims that the partial gas flow adjustment is arranged downstream of the central nozzle pipe, but in the drawings, the partial gas flow adjustment is located upstream the central nozzle pipe. Appropriate correction is required.

5. Claim 20 objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim. See MPEP § 608.01(n). Accordingly, the claim has not been further treated on the merits.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the

art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claim 19 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The applicant is claiming that the water cooled ring is rotatable about the axis of the gas injector and it is unclear whether the applicant means that the water cooled ring is radially aligned about the central axis of the gas injector or if the water cooled ring is capable actually rotating about the central axis of the gas injector. For the examination of the claims the examiner is assuming based on the drawings that the water cooled ring is fixed and not capable of rotating.
8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
9. Claim 1 recites the limitation "the ratio" in "the ratio of the diameter". There is insufficient antecedent basis for this limitation in the claim.
10. Claim 1 recites the limitation "the diameter" in "the diameter of the gas supply pipe". There is insufficient antecedent basis for this limitation in the claim.
11. Claim 11 recites the limitation "the notional prolongation" and "the generatrix" in "the notional prolongation of the generatrix". There is insufficient antecedent basis for this limitation in the claim. Both of these terms lack antecedent basis.
12. Claim 14 recites the limitation "the closure device" in "the closure device in the form of a cone". There is insufficient antecedent basis for this limitation in the claim.

13. Claim 14 recites the limitation "the outer periphery" in "the outer periphery of the central nozzle pipe". There is insufficient antecedent basis for this limitation in the claim.

14. Claim 14 recites the limitation "the inside wall" in "the inside wall of the gas supply pipe". There is insufficient antecedent basis for this limitation in the claim.

15. Claim 15 recites the limitation "the flow direction" in "the flow direction from the mouth of the central nozzle pipe". There is insufficient antecedent basis for this limitation in the claim.

16. Claims 15 and 16 recites the limitation "the inside diameter" in "the inside diameter of the central nozzle pipe". There is insufficient antecedent basis for this limitation in the claim.

17. Claim 16 recites the limitation "the flow direction" in "the flow direction from the mouth of the central pipe". There is insufficient antecedent basis for this limitation in the claim.

18. Claims 16 and 20 recite the limitation "the axis" in "the axis of the gas injector". There is insufficient antecedent basis for this limitation in the claim.

19. Claim 20 recites the limitation "the ring" in "the long diffuser and the ring are arranged together in a burner insert opening". There is insufficient antecedent basis for this limitation in the claim.

20. Claim 20 recites the limitation "the gas flow direction" in "a burner insert opening enlarging in opposite relationship to the gas flow direction". There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

21. Claims 1 and 11 rejected under 35 U.S.C. 102(b) as being anticipated by US 5,620,316 to Duboudin et al.

Duboudin teaches:

In Reference to Claim 1

A gas injector (see Fig. 1) for nitrogen oxide-reducing firing of regeneratively heated industrial furnaces comprising a gas supply pipe (pipe 8) and a mouth (8 opens at 5), wherein the connection thereof forms a long diffuser (diffuser 2) with a free jet opening angle (see angle α), characterized in that the ratio of the diameter of the mouth (D_s) and the diameter of the gas supply pipe (D_e) is smaller than three (the ratio of D_s/D_e is preferably less than 2, Col. 2 lines 61-68, also see claim 2).

In Reference to Claim 11

A gas injector as set forth in claim 1 characterized in that a central nozzle pipe (6) with a mouth (6 opens at 7) forming a free jet opening angle (6 opens at an angle that is aligned along the axis of flow) is arranged within the gas supply pipe (6 is carried inside of 8), forming an annular gap (space between 6 and 8) for guiding a partial gas flow (8 carries oxygenated combustible gas having an oxygen content of at least 5%, Col. 2 lines 50-55) between the gas supply pipe (8) and the central nozzle pipe (6), in such a way that the notional prolongation of the generatrix of the central nozzle pipe (6)

mouth goes into the generatrix of the long diffuser (it is unclear what the prolongation of the generatrix is referring to based on the specification, but if it is the angle formed between the mouth of the nozzle and the diffuser then 6 opens into the region where the angle α of the diffuser starts).

Claim Rejections - 35 USC § 103

22. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

23. Claims 12-13 and 15 rejected under 35 U.S.C. 103(a) as being unpatentable over Duboudin in view of US 6,190,158 to Legiret et al.

In Reference to Claim 12

Duboudin discloses a gas injector as set forth in claim 11 but does not teach a closure and regulating device for partial gas flow adjustment is arranged downstream (according to Fig. 2 of the application, it appears that the applicant mean upstream of the central nozzle pipe and therefore the claim will be examined as if the applicant was claiming upstream) of the central nozzle pipe.

Legiret teaches a gas injector that has valves (13, 14 and 16), which control the flow of gases into the injector and are located upstream the central nozzle pipe.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to combine Duboudin with Legiret for the purpose of providing the gas injector valves to control the flow of gases through the gas injector. It is well known to valve fluids entering the injector of a gas burner so that combustion of the gases can be controlled effectively during combustion. Therefore it would have been obvious to combine Duboudin with Legiret because all of the claimed elements were known in prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

In Reference to Claim 13

Duboudin in view of Legiret discloses a gas injector as set forth in claim 12 characterized in that the closure device comprises two separate valves (13 and 14, Fig. 1, Legiret) which are arranged in an overall gas supply pipe (oxidant gas source 12) and a secondary gas supply pipe (pipe feeding through valve 13 feeds into central nozzle pipe 8) which is branched therefrom and which directly charges the central nozzle pipe.

In Reference to Claim 15

Duboudin in view of Legiret discloses a gas injector as set forth in claim 12 characterized in that the closure device (valve 13 is opposite the end of the nozzle opening at 8, see Fig. 1 or Legiret) is arranged set back in opposite relationship to the flow direction from the mouth (valve 13 is disposed behind the gas injector and is

opposite the mouth of the injector at 8, Legiret) of the central nozzle pipe (8, Legiret) by more than five times the inside diameter of the central nozzle pipe (the nozzle is substantially spaced from the mouth by well more than 5 times the diameter of inner nozzle 8).

24. Claims 14 and 16 rejected under 35 U.S.C. 103(a) as being unpatentable over Duboudin in view of US 1,679,830 to Lang.

In Reference to Claim 14

Duboudin discloses a gas injector as set forth in claim 11, but does not teach a closure device is in the form of a cone which is axially displaceable on the outer periphery of the central nozzle pipe and which co-operates with a conical surface of the inside wall of the gas supply pipe.

Lang teaches a closure device (handle 8 and cone 18, Fig. 1) is in the form of a cone (18 is a cone) which is axially displaceable (Fig. 1 shows 18 in the fully open position and Fig.2 shows 18 in the closed position, the cone 18 moves axially along the center axis of the burner) on the outer periphery of the central nozzle pipe and which co-operates with a conical surface (conical surface 30) of the inside wall of the gas supply pipe.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to combine Duboudin with Lang for the purpose of adding a closure device on the outer periphery of the central nozzle for the purpose of controlling the amount of gas flowing through the gas supply pipe. Lang teaches a

valve mechanism where a handle is used to adjust the lengthwise position or axial position of the nozzle to control the flow of a fluid. It would have been obvious to combine Duboudin with Lang, because a person of ordinary skill has good reason to pursue the known options for valving a fluid in a burner within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary common sense. Furthermore, all of the claimed elements were known in prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

In Reference to Claim 16

Duboudin in view of Lang discloses a gas injector as set forth in claim 14 characterized in that the closure device (8 and 18, Fig. 1, Lang) is arranged set back in opposite relationship to the flow direction from the mouth of the central nozzle pipe by more than five times the inside diameter of the central nozzle pipe (the handle which controls the position of 18 is disposed more than five times the inside diameter of the central nozzle pipe and is opposite the mouth opening).

25. Claims 17-20 rejected under 35 U.S.C. 103(a) as being unpatentable over Duboudin in view of US 5,515,794 to Kassman et al.

In Reference to Claim 17

Duboudin teaches a gas injector as set forth in claim 1, but does not teach that the mouth of the long diffuser is provided with a water-cooled ring at its outside periphery.

Kassman teaches a burner that has a cooling water jacket that surrounds the burner gas injector (see Fig. 2 where water enters in the coolant supply line circles around the burner nozzle and exits in the coolant return line, the jacket 21 encircles the outer periphery of the burner nozzle).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to combine Duboudin with Kassman for the purpose of cooling the gas injector to prevent damage to the injector due to high combustion temperatures. It is well known in the art to cool gas injection nozzles of burners with annular sleeves that run coolants, such as water, to cool the outer surface of gas injectors as evidenced by Kassman. Therefore it would have been obvious to one of ordinary skill in the art to combine Duboudin with Kassman because all of the claimed elements were known in prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

In Reference to Claim 18

Duboudin in view of Kassman discloses a gas injector as set forth in claim 17 characterized in that the water-cooled ring is arranged separately (21 of Kassman is

arranged separately of the burner nozzle, 21 is wrapped around the gas injector, See Fig. 1 and Fig. 2).

In Reference to Claim 19

Duboudin in view of Kassman discloses a gas injector as set forth in claim 17 characterized in that the water-cooled ring is rotatable about the axis of the gas injector (as discussed above in the objection to claim 19, the applicant does not show how the water cooled ring can rotate about the gas injector. The ring appears to be fixed in figures 1-3 and therefore in regards to the term "rotatable", the water cooled ring is interpreted to be disposed in radial alignment with the gas injector. Kassman shows a water cooled ring 21 which is wrapped around the gas injector, see Fig. 2).

In Reference to Claim 20

Duboudin in view of Kassman discloses a gas injector as set forth in one or more of the preceding claims characterized in that the long diffuser (2, Fig. 1, Duboudin) and the ring (water cooled ring 21, Kassman, Fig. 2) are arranged together in a burner insert (gas injector assembly of Duboudin, see Fig. 1) opening enlarging in opposite relationship (the diffuser is larger in diameter than the gas supply pipe and enlarges at an angle α) to the gas flow direction, in such a way that the spacing between the water-cooled ring and the burner insert opening is at a minimum and the axis of the gas injector is rotatable about the center point of the mouth (see discussion of rotatable above, and the water cooled ring 21 of Kassman is closely spaced to the outer wall of the gas injector and it encircles the outer portion of the gas injector).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL A. BERNSTEIN whose telephone number is (571)270-5803. The examiner can normally be reached on Monday-Friday 8:00 AM - 5:00 PM EDT.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Rinehart can be reached on 571-272-4881. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DAB

/Kenneth B Rinehart/
Supervisory Patent Examiner, Art Unit 3743